



SPACE CENTER

Roundup

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2001: A SPACE ODYSSEY

See pages 4-5 for a JSC year in review

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HR is on the job

By Greg Hayes, Director of Human Resources



If we were to characterize JSC's past few years, we'd all agree that it's been a time of tremendous change. From a people standpoint, pause for a moment to consider how much the Center has changed in the past five or six years.

For those of you who keep your old JSC phone books, pull out the November 1994 issue and turn to page 13, the JSC organization chart. Of the 21 senior managers pictured, count the number still here (I'll save you some time: Two!).

Change is with us, and it's accelerating. In fact, the next few years will present more opportunities for change than we've likely ever seen. Thus, I'd like

to give you some insight into how your HR team is planning for the future.

Workforce thoughts

Nearly a third of the JSC workforce is eligible to retire today. While we hope they won't leave all at once, in general people do leave within a few years of attaining eligibility. The Center needs a better understanding of the implications associated with this and other workforce dynamics so that we can plan our recruiting, hiring and development programs accordingly.

At the same time, more than 340 of our civil service teammates are new to JSC in the last two years. We'll add another 120 or so this year, which means more than 12 percent of our civil service workforce will have three or fewer years of experience by the end of FY2002. This presents a real challenge for us from a development standpoint, so we're emphasizing a number of efforts designed to bring the new members of our workforce up to speed as quickly and efficiently as possible.

Dealing with stress and improving morale

Given the challenges we have ahead of us, we know that we'll have to continue to pay close attention to issues of stress and morale. We believe we're making some progress toward dealing with our stress issue, however much remains to be done. Rest assured we will continue to address that issue through ongoing activities as well as some new efforts.

We're working now, for example, to put more tools in the hands of managers to help them identify and deal with potential problems early on, hopefully identifying some of the "leading indicators" of stress. We're close to providing periodic reports of other indicators, including overtime and comp time trends, forfeited leave and so forth, which indicate potential problems. We'll continue to work with our partners in Space and Life Sciences to attack this problem.

Under the guidance of our new Exchange Manager, Debbie Conder, you'll also see a number of improvements in the services we offer through our JSC Exchange http://jscpeople.jsc.nasa.gov/jsc-hro-2/jsc_exchange/default.htm – the cafeterias, Gilruth Center, stores, etc. We have just finished a major remodeling effort of the upstairs portion of the Gilruth to better accommodate your training, conference and social needs.

Our new on-line store, ShopNASA.com, is now operating, giving you the opportunity to shop from your workstation. We also are exploring a number of new services we can provide – ranging from take-home meals to shoe repair – in response to the comprehensive needs survey we recently conducted. You'll be hearing more about these possibilities in a separate *Roundup* article soon.

As mentioned above, change is with us, and it's not going to slow down. We are responding to those needs as rapidly as possible as the list below shows:

- ❖ Two new Leadership Programs: A Leadership Development Program <http://leadership.jsc.nasa.gov> and a Center-wide Mentoring program <http://jscpeople.jsc.nasa.gov/mentoring/> (future *Roundup* coverage)
- ❖ Increased training for the center, including more and better computer-based training
- ❖ An Oral History Program that continues to capture the best of our retiring leadership
- ❖ Added change-management staff to assist the workforce and directorates
- ❖ New Automated Recruiting and Staffing Tool (NASA STARS) <http://nasastars.nasa.gov/> for staffing and recruiting
- ❖ Two new Education programs: The Middle School Aerospace Scholars and the Community College Aerospace Scholars <http://education.jsc.nasa.gov/Educators/MAS> (future *Roundup* coverage)

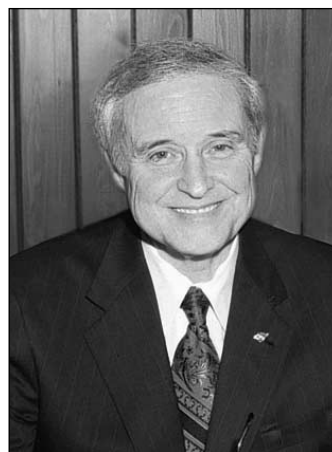
Let us hear from you

Above all else, HR is a service organization. We're committed to doing those things that help build a committed and capable workforce and which prepare us for the future. We're interested in hearing from you. We'll be doing more surveys, both formal and informal, in the future to determine how we're doing and how we can better serve you.

We believe we can do even more to help the Center achieve its objectives. If you have ideas about how we can do so, let us know. We do listen – the Mentoring program resulted from an idea put forth by the JSC Diversity Council. ❖

For more information at HR, please visit our Website at <http://hro.jsc.nasa.gov/>

FROM THE DESK OF ROY S. ESTESS



The Space Center *Roundup* has been reporting the news at JSC for more than 40 years.

I hope everyone was able to enjoy the recent edition of the *Roundup* that reflected on the history of JSC and how we have grown into the

strong center we have become.

The *Roundup* has helped us celebrate our achievements and reflect on our successes. We look to the *Roundup* to provide us with the latest news and to share in the story of JSC. As we continue the exploration of Human Space Flight, we see our *Roundup* news coverage also moving forward into a new look and style.

I hope you enjoy this new *Roundup*. We are proud of this publication as it continues to serve as reflection of our community here at JSC.

Roy S. Estess

WISDOM GAINED, WISDOM GIVEN JSC launches new mentoring program

This month, JSC introduces a new mentoring program designed to enhance, or guide, the personal and professional growth of each of our employees.

The program links a mentor with a protégé to help facilitate personal and professional growth by sharing the knowledge and insights learned through the years. Mentoring is a strategy for comprehensive growth and development and in its truest form, a reciprocal relationship.

Both members have a chance to learn, to gain a new perspective on the work environment, to stretch beyond comfortable boundaries and to meet people from across the center.



"People are the most important product of any organization and mentoring is the most important job any of us have," said Randy Stone,

JSC Deputy Director. "Take the time, make the effort, build a bright future!"

Visit <http://jscpeople.jsc.nasa.gov/mentoring/> for information or to apply online for the mentoring program. Applications will be accepted Jan. 22 through Feb. 8, 2002. The mentoring program is open to all permanent JSC civil servant and military employees in Houston and at White Sands Test Facility.

Welcome to 2002 and welcome to a new Roundup!

You might have noticed this issue looks different than previous issues. However, that's just one change in the overall product.

The *Roundup* is now a monthly magazine. Each issue will feature regular columns by Directors, interesting stories and entertaining profiles. The new *Roundup* will provide in-depth coverage of the people and programs that make JSC a success.

To better serve you, the print *Roundup* is now working hand-in-hand with the online *CyberRoundup*.

As in the past, the *CyberRoundup* will be updated Monday through Friday for all the latest information.

In addition to all that was there before, the *CyberRoundup* will now give you more announcements, current news and feature stories.

You will now have the best of both worlds – detailed coverage with the *Roundup* and the latest news with the *CyberRoundup*.

As always, please submit your information and articles to Melissa Davis, at melissa.davis1@jsc.nasa.gov.

Finally, please make it part of your daily routine to visit *CyberRoundup*. Go to <http://www.jsc.nasa.gov/pao/roundup/> and bookmark it.

You'll never know what you're missing if you don't! ❖

WSTF helps Odyssey Spacecraft surf the waves of the Martian atmosphere

With increased national interest in the success of NASA's 2001 Mars Odyssey Mission and the red planet in general, a White Sands Test Facility (WSTF) team is proud of its work on the pyrovalves aboard the Mars Odyssey spacecraft.

The pyrovalves are single-use, explosively actuated isolation valves that initiate the flow of propellant to the various rocket engines aboard the spacecraft.

The Mars Odyssey mission is well under way and in a looping orbit around Mars of 18 hours and 36 minutes. The spacecraft will be literally surfing the waves of the Martian atmosphere in a process called aerobraking, which will reduce the long elliptical orbit into a shorter, two-hour circular orbit of approximately 400 kilometers (about 250 miles) altitude.

The WSTF pyrovalve team was formed in 1995, following the loss of the Mars Observer spacecraft in 1993, which stopped communicating just as its rocket engines were being activated for spacecraft orbit around the planet.

This failure, as well as the subsequent destruction of the Telstar 402 and Landsat 6 satellites, was strongly related to the actuation of these explosive pyrovalves. As early as 1996, WSTF testing revealed that the older type pyrovalves, such as used on the Mars Observer, could leak pyrotechnic constituents into the highly reactive hydrazine propellant system, triggering an explosion that could destroy the spacecraft.

NASA Headquarters established a Mars Observer Propulsion and Pyrotechnics Corrective Action Test Program with representatives from headquarters, WSTF and several other NASA centers and industry leaders.

WSTF was requested to perform testing and prepare documentation to support the corrective action effort. In response to the requests, they designed and built a dedicated pyrovalve test facility and laboratory to measure and analyze any tiny quantities of the pyrotechnic actuation charge, called "blow-by," which may escape from the valve into the stream of liquid propellant.

These state-of-the-art facilities include a laser-based velocity interferometer to characterize operation of internal components of the pyrovalves. WSTF also developed special processes in coordination with neutron-radiographic facilities to inspect internal seals and disclose the distribution of blow-by constituents inside the valves.

The program thoroughly characterized pyrovalve operation, identified the mass and chemical constituents of pyrotechnic blow-by and clearly demonstrated how the hot blow-by particles could cause the hydrazine to explode by performing system level simulations.

The WSTF work did not stop there though. They developed improved pyrovalve configurations and continued to work with manufacturers to develop safer and more reliable valves.

For example, the early pyrovalves used on the Mars Observer spacecraft could leak more than 20 milligrams of hot blow-by gas and particles into the propellant stream, whereas the redesigned valves typically leak as little as a 10,000th as much.

During WSTF blow-by testing of the valve configuration chosen for use on the Odyssey vehicle, one valve failed to open upon command. The valve manufacturer incorporated improvements following the WSTF failure, but analysis indicated that a failure might still be possible.

The risk of an Odyssey pyrovalve failure was considered low, yet the Odyssey Program wanted the risk mitigated since such a failure on the real vehicle could have meant the loss of the mission.

Since there was only two months until the planned launch of the Mars Odyssey mission, a joint NASA-Industry risk reduction team was rapidly assembled, which included the WSTF team personnel.

The valve manufacturer made design and material changes as directed by the risk reduction team, and testing at both contractor and WSTF facilities indicated the problem had been solved, leaving just enough time to install the new components into the

pyrovalve and interface the spacecraft to the launch vehicle.

"This was a great program for me," said Steve Schneider, NASA program manager. "When pyrovalve behavior is anomalous, a panic situation usually results."

The Mars Odyssey Mission was successfully launched April 7, 2001, as originally planned. Subsequent NASA programs directly benefiting from the WSTF work have included the Chandra X-ray Observatory, the Mars Surveyor 1998 spacecraft, the X-38 Crew Return Vehicle and other commercial projects.

Since 1995, highlights of the WSTF pyrovalve testing and analysis have been published in nine American Institute of Aeronautics and Astronautics (AIAA) journals.

Last year's presentation won best paper in the Energetic Components and Systems Technical sessions at the 36th annual AIAA/American Society of Mechanical Engineers/Society of Automotive Engineers/American Society of Engineering Education Joint Propulsion conference.

Current WSTF Pyrovalve Team members are Regor Saulsberry (NASA), Howard Julien, Max Leuenberger (Honeywell), and William Smith (Honeywell) and Aaron Paz (NASA Co-op).

"It was my pleasure to work on the test methodologies and new facilities for pyrovalves at WSTF with such a dedicated and capable group of people," Schneider said.

Paz enjoyed being part of the project. "My involvement in this project was to actually run some of the pyrovalve tests," he said. "As a NASA Co-op, I must say that it is extremely rewarding to know that the work I have done here has a very significant purpose."

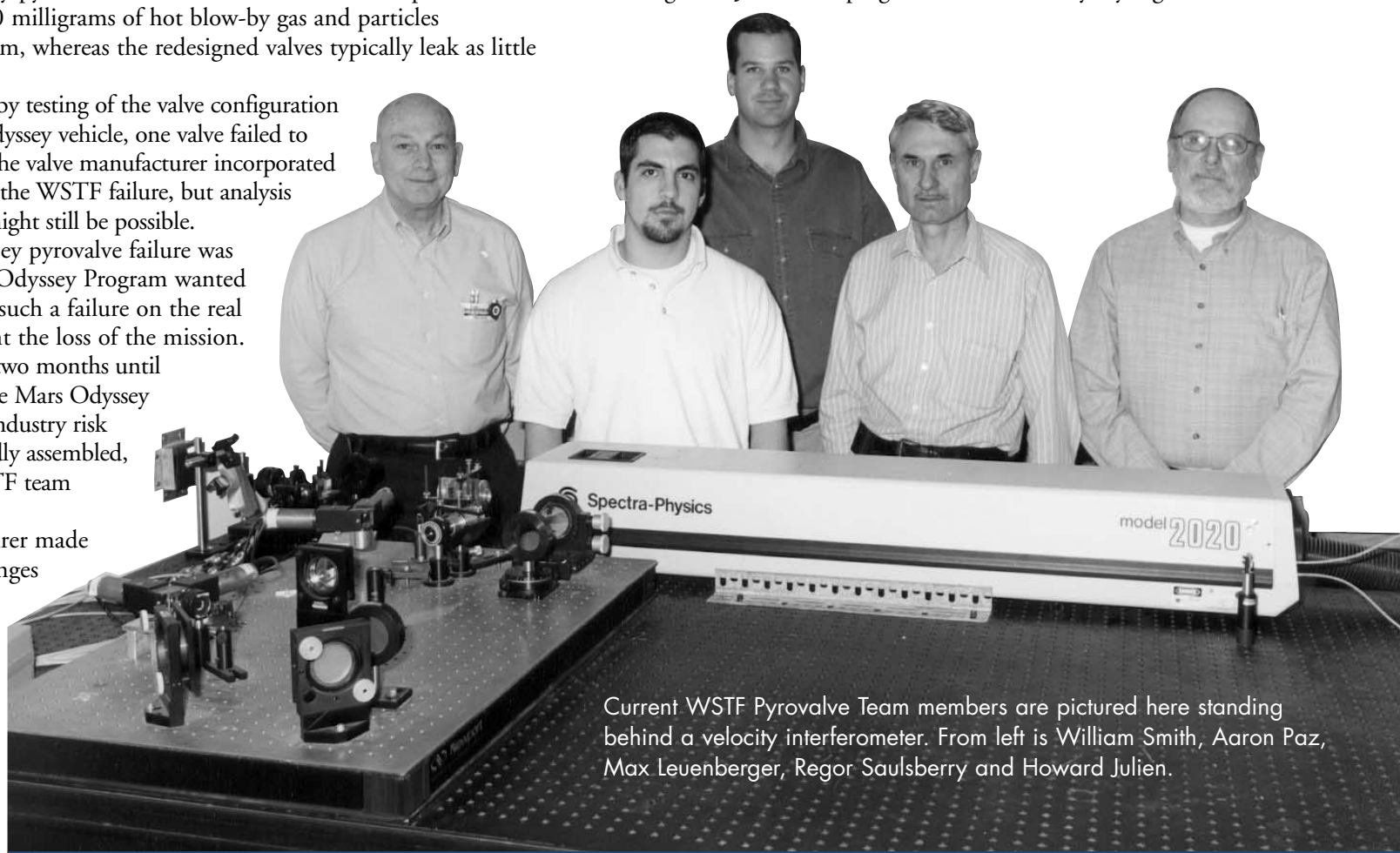
He added, "It has also been a great learning experience. My future plans are to design and test more advanced pyrovalves, which could reduce the amount of gas blow-by and improve spacecraft reliability."

The team is now working a NASA Headquarters request to refine pyrovalve test methods and develop improved valve designs and nondestructive test methods, as well as to create a pyrovalve applications handbook to enhance spacecraft safety.

"Having the Pyrovalve Blowby Analysis Laboratory and Pyrovalve Propellant Hazardous Test Facility at WSTF is important for NASA to address future pyrovalve concerns," Schneider said. "I learned a great deal about pyrovalves on this program, especially that the 'devil is in the details' when designing test apparatus and evaluating the data."

The team also continues to serve NASA and the propulsion industry at large as they remain vitally involved in the success of the pyrovalve operations aboard NASA spacecraft, such as the 2001 Mars Odyssey.

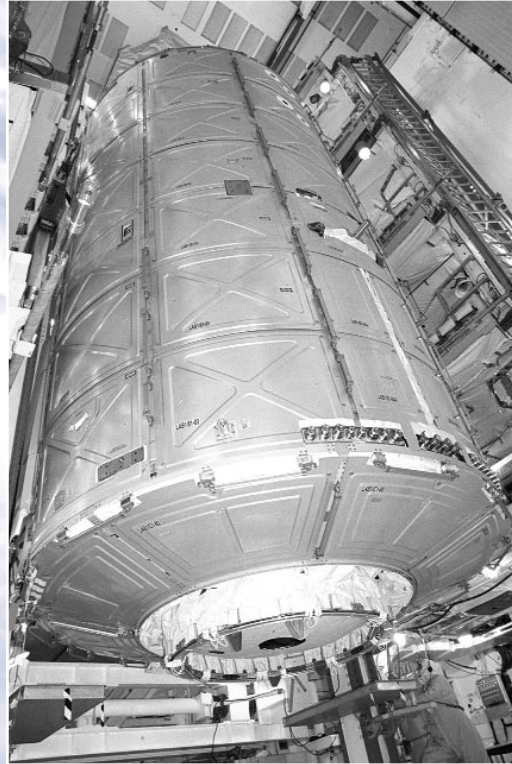
"We're really pleased to have been able to play some small part in the success of these missions," Saulsberry said, "and we look forward to the frequent reports coming from JPL on the progress of the Mars Odyssey flight." ♦



Current WSTF Pyrovalve Team members are pictured here standing behind a velocity interferometer. From left is William Smith, Aaron Paz, Max Leuenberger, Regor Saulsberry and Howard Julien.

YEAR IN REVIEW

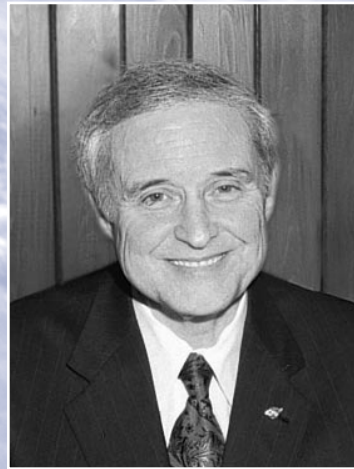
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January
U.S. Destiny Laboratory



February
George Abbey, above,
appointed Senior Assistant
for International Issues



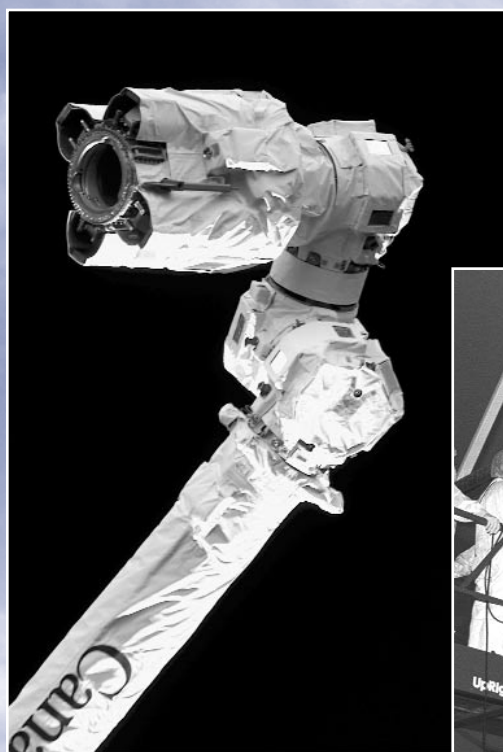
Roy S. Estess, right,
named Acting JSC Director



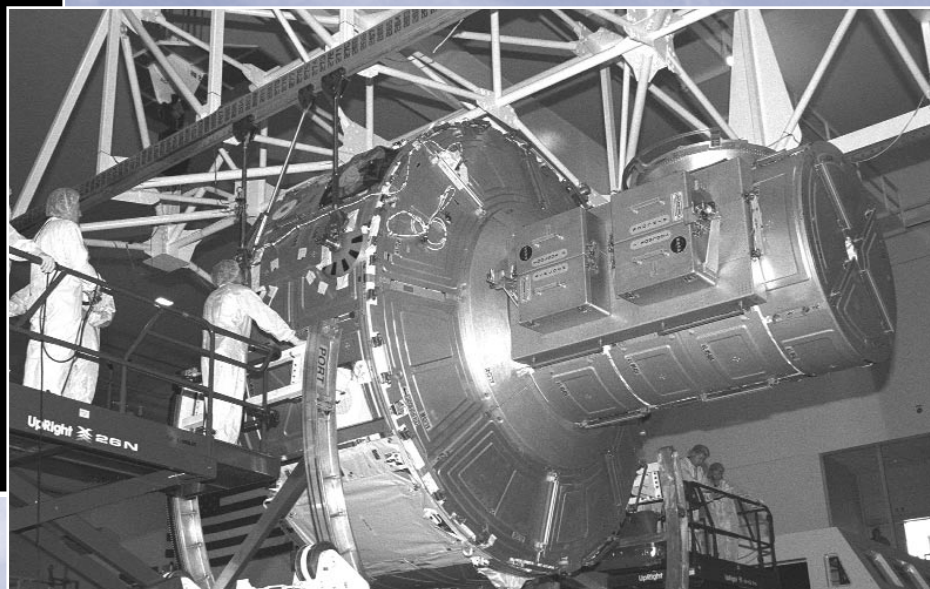
March
Return of the Expedition 1 crew



April
NASA marks the 20th Anniversary
of the Space Shuttle



April
Canadarm2



July
Joint Airlock Module Quest

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January

- The U.S. Destiny Laboratory is launched aboard STS-98.

February

- White Sands Test Facility's Engineering Department wins the New Mexico Quality Award.
- George Abbey is appointed to the position of Senior Assistant for International Issues on Feb. 23. Abbey served as JSC's Director since 1996. Roy Estess is named Acting JSC Director.

March

- Expedition 1, the first permanent crew aboard the ISS, returns home.

April

- NASA marks the 20th Anniversary of the Space Shuttle.
- A Canadian 'handshake in space' occurs as the Canadian-built space station robotic arm transfers its launch cradle over to *Endeavour's* Canadian-built robotic arm.

May

- NASA Astronaut Patricia Hilliard Robertson dies May 24 as a result of injuries obtained in the crash of a private plane.

June

- Co-ops organize a flood relief drive for local flood victims after Tropical Storm Allison.

July

- STS-104 delivers the Joint Airlock Module Quest to the ISS, completing the final phase of the early assembly sequence.

August

- Approximately 140,000 visitors attend JSC's Open House 2001 for a behind-the-scenes look at the home of human space flight excellence.
- Expedition 2 is welcomed home.

September

- JSC unites after the Sept. 11 terrorist attacks.

October

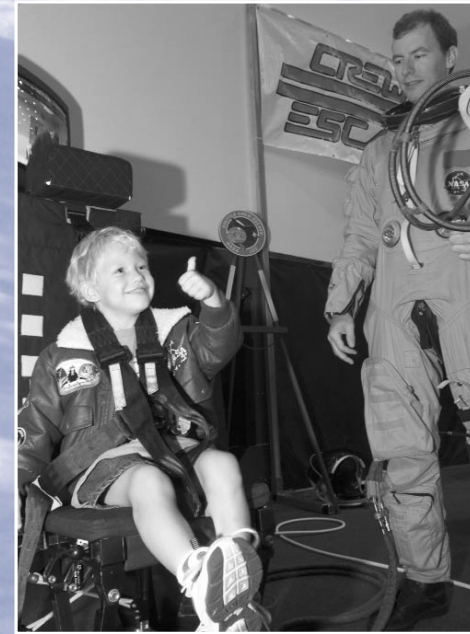
- After nearly 10 years as the head of America's space program, Daniel Goldin announces his resignation.

November

- JSC celebrates 40 years of leading America into space, while the Roundup celebrates its 40th anniversary.

December

- Expedition 3 returns safely to Earth.



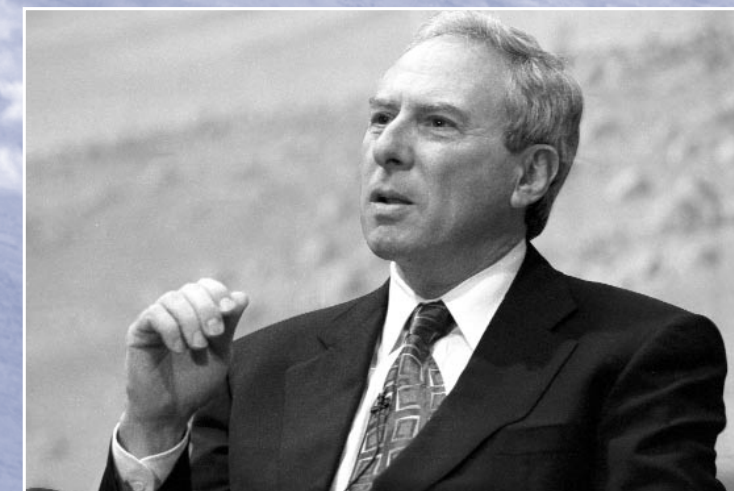
August
Open House 2001



August
Return of the Expedition 2 crew



September
JSC unites
after terrorist attacks



October
NASA Administrator Dan Goldin
announces resignation



November
JSC celebrates 40 years of
leading America into space



December
Return of the Expedition 3 crew

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Roundup

ISS: Moving into the future

By Tommy Holloway, International Space Station Manager

It is now 2002 and we have a human outpost in space with permanent international presence, where micro gravity research is well under way.

The International Space Station is a bright new star darting overhead every 90 minutes, making its rounds over 95 percent of the Earth's population, and it is a beacon of something new. Human space flight has been transformed through ISS, and evolved into cooperative endeavors of world nations, businesses and academic institutions. There is great hope ahead, and many countries are betting on the returns from operating and using this incredible new station in Earth orbit.

The year 2001 has been both tough and tremendous: Tough because of the criticism NASA has received about cost management of the Program; tremendous because of the 20 space flights that were executed safely and extraordinarily well in the last 18 months.

The international technical teams have performed spectacularly, and continue working side-by-side to triumph over obstacles encountered large and small, while doing things never done before.

As we move into the future we will be challenged to keep the financial aspects of the Program on par with our technical performance. The budget situation on the NASA side of the house presents us with an interesting and difficult challenge. We need a path through this wilderness and we are forced to consider a broader set of issues beyond the Program management's reach, such as NASA-wide reorganization, research prioritization and guidelines for commercialization, to name a few.

The future of ISS will also depend on the things we can do:

- ◆ Safety first always – safety for the crew, safety for ground teams and safety for the hardware
- ◆ Maintain technical excellence
- ◆ Adhere to schedules
- ◆ Proactive and positive response for improving cost management and improving management information systems
- ◆ Keep our core values front and center: Safety, commitment, integrity, trust, respect for people and technical excellence

We've been directed to implement a set of recommendations per the ISS Management and Cost Evaluation (IMCE) Task Force Report issued November 2001. There is much work to be done to resolve the differences between the "U.S. core complete" baseline (defined by the Office of Management and Budget and NASA, and confirmed by IMCE) as the program baseline – with three-person crew, minus the Habitation Module and Crew Rescue Vehicle – and the Program baseline approved by the ISS partnership.

These challenges will need to be overcome as we continue our "climb up the mountain," building and operating the ISS.

The amazing year (and a half) of space flight

The July 12, 2000, Service Module launch set in motion an unprecedented succession of space flights – nine U.S. and 11 Russian.

In the year and a half before the Service Module launch, four missions went to ISS. A total of 24 flights (12 U.S./12 Russian) gave us the 300,000 pounds of micro gravity facility we have today, with nearly 15,000 cubic feet of living and working space, and our fourth Expedition in progress.

We've added 19kw of power with the P6 solar array on STS-97, quintupled on board computing and activated a fully functioning laboratory delivered on STS-98 in February 2001. All major systems are functioning nominally.

On ISS flight 6A, STS-100 in April 2001, we added state-of-the-art robotics system by deploying Canadarm2. We also installed an American joint airlock Quest in August 2001 and a Russian docking compartment called Pirs in September 2001, enhancing an aggressive schedule of spacewalking activity.

We have deployed 12 major elements on orbit: Zarya, Zvezda, Unity, 3 PMAs, Z-1, P6, Destiny, CanadaArm2, Quest and Pirs. The Station has a Soyuz lifeboat, reusable moving vans (MPLMs) and refuel/resupply (Progress) services.

We've logged 50,000 hours of U.S. payload run-time since STS-106 (September 2000). We have been experimenting in both U.S. and Russian segments and Expeditions have been averaging about 19 hours a week since April 2001. Our fourth Expedition crew arrived in December 2001 and is just beginning their increment, which will include work on 25 scientific payloads. Its been characterized as "the most diverse, most complex research program of any Expedition so far."

Amazing also describes the work done by ISS technical teams on the ground and on orbit to overcome challenges of all sizes – from delivering a series of extremely complex elements, to managing and executing the most intricate space operations in history, to recovering from multiple main computer failures. From learning how to deploy and fix the largest solar array, to re-programming robotic joints, to managing traffic jams.

Enormous effort has been expended to keep every aspect of ISS flight and operations "in a box" and moving at a safe pace. Review teams agree that the technical integration and engineering achievements building and operating the ISS have been "extraordinary." And that's because extraordinary people, in every sector of this Program, have done their job superbly.

The challenges of Phase 3: What's ahead for ISS

Phase 3 assembly and operations of ISS focuses on expanding and powering up the station toward its permanent configuration. We have an executable plan for 2002 and 2003, where we will expand the ISS structure, add more power and enable international support capability.

All of the U.S. hardware for the next two years is completing processing and will soon be ready to go. Japan and Europe continue to work on their laboratories, "Kibo" and "Columbus," to prepare for arrival on orbit in 2004 or early 2005.

Enhanced utilization and research is also a major goal for Phase 3. During this increment, we'll take up two more research racks, bringing the total to seven racks on orbit, and install additional scientific equipment.

The IMCE confirms NASA's near-term goal for ISS as "U.S. core complete." The report further suggests that, when the Program/NASA shows adequate acknowledgment and correction for deficiencies identified in management structure, institutional culture and cost estimating within the next two years, there are opportunities to pursue a path to an "end state" with enhanced capabilities.

Our partners have pointed out that "U.S. core complete" is not defined in ISS international agreements, and that their expectation is to have enough crew time on orbit to perform research planned in the multiple labs. The IMCE does not consider it within its scope to recommend how to bridge the gap between what the United States has promised and what the partners expect.

Fulfilling the commitments NASA has made to ISS partners will require support and leadership beyond Program boundaries. We have embarked up this mountain together – to build a bridge for the future and leverage investments in science and people that are expected to yield considerable benefit for the future. We will continue to rely on our "due processes" to keep every aspect of building and operating the ISS moving in a positive direction.

The overall research budget has been reduced 40 percent from the original plan, requiring reorganization and a reprioritization of resources and research goals. This will not be an easy or happy task. We are not relieved of our requirements and obligation to the nation and our partners to perform world-class research in our micro gravity facility.

The Program has already begun rigorous responses to the IMCE recommendations. You will be hearing more details as they develop. We are putting plans in place to improve our processes and management information performance. Success will require the same level of dedication and commitment that resulted in the amazing year and a half of space flight.

The long-term future

We are living in a changing world and human space flight is changing along with it. When the Apollo Program brought back images of what the Earth looks like from space in the 1970s, it had an impact on the way we perceived life on our planet. We are still learning from that experience.

Images from the ISS returned since the beginning of the 21st Century show American and Russian commanders routinely handing off control of a one-of-a-kind space research facility, while an international team of space flight experts hardly miss a beat preparing for the next steps.

I remember the Synthesis Report in 1991 entitled "America On the Threshold." Synthesis Group Chairman Thomas Stafford, in his opening remarks, recalled the great Chinese fleets of the 15th Century that set out to explore the world's oceans beyond where man had ventured before.

A change of policy during the Ming Dynasty arrested the movement and the "great fleets" were burned, just as a new set of explorers from Portugal began venturing out. The lead exploration role soon fell to Spain, and then Britain.

His point was: "Nations lose their leadership position when they give up the role of exploration...and the question is which path to take with regards to the oceans of the 21st Century."

The future is a wide-open door

The ISS Program is not just American. NASA is leading in an effort that is international and every bit as important to Russia, Europe, Canada and Japan as it is to the United States. We may even see "Taikonauts" (Chinese word for Astronaut/Cosmonaut) in Earth orbit sometime in the future.

I believe we will one day conquer the space 240 miles above our head, and we will move back to the Moon 240,000 miles away and onward to Mars, more than 48 million miles further – and beyond.

You've heard me say before that building the International Space Station is like climbing a mountain. Well, we are deep within the mountain range and we've just climbed the steepest peak so far. But the cold wind is in our face, we have to find a place to regroup and get back our view of the summit.

We're on to the challenge around the next bend. It will take patience, innovation and endurance but I'm confident we'll get there. See you on top! ❖

Space Shuttle: Flights to set records

By James Hartsfield

Fresh on the heels of making space history in 2001 by completing the first phase of International Space Station (ISS) assembly in orbit, the Space Shuttle will continue a string of space firsts during six missions in 2002.

"In the past 12 months, we've completed some of the most challenging space flights in history," Space Shuttle Program Manager Ron Dittmore said. "In the next year those challenges will continue with missions just as complex. The team continues to excel safely and successfully, and 2002 promises to be just as rewarding as the past year."

The coming year will be marked by the shuttle fleet matriarch *Columbia's* return to space on the first non-station shuttle flight in more than two years. Flights by *Atlantis* and *Endeavour* will begin the expansion of the ISS. *Discovery* will remain on the ground in 2002 for standard maintenance and inspections.

"We have simultaneously been planning, training and flying the most complex shuttle missions we have ever done, and the results have been truly awe-inspiring," Chief Flight Director Milt Heflin said. "The team has tremendous reason to be proud of its accomplishments, but not much time to bask in them because the year ahead holds more of the same. But it is exactly that challenge on which I think Mission Control, the planners, the trainers, the crews and the entire team thrive. These kinds of missions are why they work here."

During 2002, shuttles will add more than 50 tons of additional components to the station. They also will service the Hubble Space Telescope and conduct an extended research mission. NASA will break a record set only last year for the most space walks ever conducted in a single year.

"Space walks will never become routine, but we have entered an era of space exploration now where they will continue to become more common," Heflin said. "But no matter how many or how often crews leave their spacecraft, each EVA remains just as exciting to prepare and conduct and just as rewarding to complete."

From space shuttles alone, 15 space walks are planned this year. Coupled with seven space walks that are planned by crews from the ISS, the record for annual space walks will be shattered.

In 2001, 18 space walks were conducted – 12 from the shuttle and six from the station – the most by far of any year to date. This year also will see the shuttle carry more than three dozen new experiments to the station and two new laboratory experiment racks. ♦



Here's a look at this year's scheduled missions:

February

Columbia will start out the new year's shuttle missions with a flight to the Hubble Space Telescope on STS-109, the fourth mission to service the space telescope since its launch in 1990. Five space walks will be conducted during the flight to install an advanced new camera system, attempt to reactivate an existing infrared instrument system, install new solar arrays and install a new power controller. The mission will extend the lifetime and capabilities of the now-famous orbiting telescope.

"*Columbia's* flight to service Hubble, as we continue to oversee station operations, signals a return for us this year to conducting two distinct activities in space, completely independent of one another," Heflin added. "That's something we haven't done in awhile, and it adds yet another element of complexity to the year ahead."

When *Columbia* launches, it also will become only the second shuttle ever to fly with a new "glass cockpit," which was installed as part of maintenance and modifications completed in 2001. *Atlantis* was the first shuttle orbiter to debut the new cockpit in May 2000 on mission STS-101.

The new cockpit has 11 full-color, flat-panel displays that replace 32 gauges and electromechanical instruments and four cathode-ray tube monitors in the old cockpit. The new cockpit is lighter, uses less power and sets the stage for a future "smart cockpit" for the shuttle that is now in development – a cockpit that will feature new, more intuitive displays to reduce pilots' workloads during critical periods.

April

Atlantis will lift off on STS-110 to begin the shuttle fleet's expansion of the station, delivering the first of three giant truss segments to be launched this year. The truss will form the central segment of what will eventually become a more than 300-foot cross-beam for the station to support future solar arrays, radiators and external experiments.

Atlantis also will carry the first part, called the mobile transporter, of a system that will provide a mobile base for the station's robotic arm to allow it to move up and down the eventual football-field-long truss. Four space walks will be conducted from *Atlantis* to install the new station components in one of the most complex station flights of the year.

May

Endeavour is scheduled to launch on STS-111 to carry a fifth crew to the station, as well as the Leonardo logistics module filled with experiments and supplies. *Endeavour* also will deliver the mobile base system to the station, the second part of the mobile platform for the station's innovative Canadarm2 robotic arm. Two space walks will be conducted while *Endeavour* is at the station to hook up the arm's base and perform other assembly tasks.

June

Columbia will fly again on STS-107, an international mission dedicated to micro gravity science that will carry a double Spacehab module filled with 32 experiments involving 59 separate investigations. A suite of eight additional investigations in *Columbia's* payload bay, together called FREESTAR, will include studies ranging from fluid physics to a student satellite. The mission's scientific work will involve the fields of materials science, combustion, fundamental physics and biology. The mission will be an extended flight with a duration of 16 days.

August

Expansion of the ISS will resume as *Atlantis* makes its second visit of the year to the complex, carrying the first starboard side truss segment. The new segment will be attached to the end of the central segment delivered in March. The connections will be finalized during two space walks.

September

The final mission of 2002 will see *Endeavour* visit the station again, attaching a port side truss segment to the station, completing almost half the length of the final truss. *Endeavour* also will deliver a sixth crew to the station. Two space walks will be performed to connect the new truss segment, and the truss will measure about 133 feet long by the end of the year.

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SPACE CENTER
Roundup

Profiles

Sue Leibert



carried the Olympic torch

By Beth Nischik

JSC's Sue Leibert could easily describe her recent experience in two words: **Just awesome.**

On Dec. 10 at 3:01 p.m., Leibert, who works in Human Resources, participated in the 2002 Salt Lake Olympic Torch relay.

Her experience, while unique to most, will be shared with more than 11,500 torchbearers and 4,500 other support runners along the torch's path.

The torch began its journey through Houston on a 30-mile loop that began with Olympian Laura Wilkinson at 1p.m. in Downtown Houston and ended with a

final run from Olympian Mary Lou Retton at 8 p.m. at The George R. Brown Convention Center.

For three minutes, Leibert was a part of Olympic history. While she was running with the torch, Leibert said all she could think of was, "Wow, this is really happening!"

The torch was heavy at first, but as she was running, "the torch felt light as a

feather," she said. "We were welcomed to run at any pace, there were people in wheelchairs and runners, a range of paces and people."

Leibert's best friends, Jeff and Diane DeTroye nominated her through a contest sponsored by Chevrolet. Nominees were selected not by athletic ability, but for their fire within.

Leibert had no idea she was considered, let alone selected, for the honor. She was notified via a FedEx package from Chevy after returning from vacation. As she read through the material, she at first thought it was a joke. However, the many legal forms and thorough logistics told her it was legitimate.

Even after learning she was selected, she was still clueless about one important aspect: "I had no idea who nominated me, until I got an e-mail note from my friends."

The theme for the contest was inspiration and illumination. Diane DeTroye said she and her husband nominated Leibert because her extensive community involvement is indeed inspirational to them and others.

"Needless to say, we were thrilled when she was selected," DeTroye said.

Leibert is involved with the Bay Area Turning Point, and served on the board of Trustees. She taught English as a second language through the United Way and the Harris County Library for about five years.

She started at NASA in 1984 and, within 17 years, has been involved in a number of organizations and numerous achievements. Leibert was selected as Federal Employee of the Year in 1998 by her managers in HR, and she received the NASA Certificate of Commendation.

With her family and friends present on that December day, Leibert successfully completed her torch run, and then went on to celebrate. "I think I had more pictures of me that day than I had in my entire life!" she said.

The Olympic Torch Relay has been a tradition since 1952 when it was adopted from an idea proposed by a chairman of the 1936 Berlin Games. Symbolizing spirit, knowledge and life, this event delivers the Olympic Flame from Greece to the host country.

The Flame of the 2002 Winter Games was lit November 19, 2001, in Olympia, Greece. It traveled to Athens before arriving in Atlanta, Ga. – the previous U.S. city to host the Olympic Games. Now, it's headed to Salt Lake City, Utah.

What was it like for Leibert to have this honor? "It was one of the best experiences of my life." ❖



Don Bogard

honored for his work with 'poor man's space probes'

By Aaron Wyatt

Don Bogard never underestimates the importance of meteorites. "Meteorites have been called the 'poor man's space probes' because we don't have to travel into space to get them," he said.

"We have learned a great deal about the origin and evolution of our solar system from their study, and there is a great deal more to be learned."

The JSC scientist's dedication to studying meteorites has earned him a prestigious honor. Bogard will be the 2002 recipient of the Meteoritical Society's Leonard Medal for his outstanding contributions to the field of meteoritics. The Leonard Medal is the society's highest honor.

According to the nomination, Bogard will receive the medal for "his distinguished contributions to noble gas geochemistry and the chronology of the solar system."

The award was established in 1962 in memory of the first president of the society, Professor Frederick C. Leonard, with the purpose of encouraging original research in the broad field of meteoritics. Bogard will receive his award at the society's annual meeting next July in Los Angeles.

Society member Ed Scott said Bogard is best known for dating meteorites and lunar samples. "His work provides the definitive proof that a rare group of meteorites came from Mars," Scott said.

Don Bogard

Place of birth:

Washington County, Arkansas ("That's in the Ozarks")

Time at JSC:

1968-present

Organization:

Planetary Sciences, Earth Science and Solar System Exploration Division (SN), JSC

Position Title:

Senior Scientist, Planetary Materials (Planetary Studies)

Education:

- B.S., chemistry, University of Arkansas, 1962
- M.S. radiochemistry, University of Arkansas, 1964
- Ph.D., nuclear geochemistry, University of Arkansas, 1966
- Post-doctoral fellow, Department Geological & Planetary Sciences, California Institute of Technology, 1966-68

Hobbies:

Gardening and old railroads

Bogard has been employed at JSC for 33 years and currently works in Planetary Sciences, Earth Science and Solar System Exploration Division (SN). In 1982, he performed the research that demonstrated certain meteorites derived from Mars.

Bogard also participated in the construction of the Gas Analysis Laboratory in the JSC Lunar Receiving Laboratory and served as a member of the Preliminary Examination Team for Apollo returned lunar materials.

He served as a member of NASA's Mars Sample Handling and Requirements panel in 1997 and 1998, as well as NASA's Solar System Exploration Subcommittee from 1995 to 1999.

Currently, Bogard is conducting a research program at JSC involving noble gas isotopic measurements on planetary materials. Scientific objectives of the research include the establishment of chronologies and thermal histories for the moon and asteroidal parent bodies of meteorites, and investigation of the composition and origin of volatile components in the solar system.

Members of the society choose the Leonard Medal recipients. Bogard said the most meaningful awards are those given by peers because they can be quick to criticize.

"When you give a science talk and say something dumb, they'll let you know," he said. ❖

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